

**SECURITY HAVING SEMICONDUCTOR CHIP**

Patent Number: JP2001283011  
Publication date: 2001-10-12  
Inventor(s): USAMI MITSUO  
Applicant(s): HITACHI LTD  
Requested Patent: JP2001283011  
Application Number: JP20000092951 20000328  
Priority Number(s):  
IPC Classification: G06F17/60; B42D15/10; G06K19/077; G06K19/10; G07D7/10; H04L9/32  
EC Classification:  
Equivalents:

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**Abstract**

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**PROBLEM TO BE SOLVED:** To make it difficult to forge securities by applying high-level copying technique used to only a normal paper basically to a method of embedding a metallic pattern such as a character into various kinds of token device mediums and detecting this pattern electrically by the presence/absence of metal.

**SOLUTION:** In the securities, a medium includes one or plural semiconductor chips, in which semiconductor chips with a function for sending a recognition number included in the semiconductor chip itself and semiconductor chips without having the function coexist.

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## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-283011

(43)Date of publication of application : 12.10.2001

(51)Int.Cl.

G06F 17/60  
 B42D 15/10  
 G06K 19/077  
 G06K 19/10  
 G07D 7/10  
 H04L 9/32

(21)Application number : 2000-092951

(71)Applicant : HITACHI LTD

(22)Date of filing : 28.03.2000

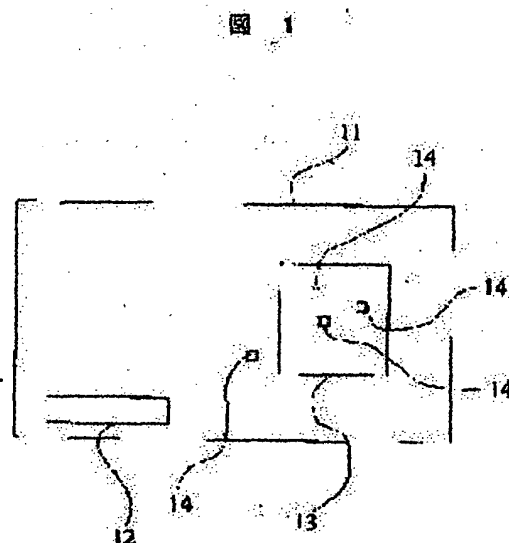
(72)Inventor : USAMI MITSUO

## (54) SECURITY HAVING SEMICONDUCTOR CHIP

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To make it difficult to forge securities by applying high-level copying technique used to only a normal paper basically to a method of embedding a metallic pattern such as a character into various kinds of token device mediums and detecting this pattern electrically by the presence/absence of metal.

**SOLUTION:** In the securities, a medium includes one or plural semiconductor chips, in which semiconductor chips with a function for sending a recognition number included in the semiconductor chip itself and semiconductor chips without having the function coexist.



## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

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JP A 2001-283011

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CLAIMS

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[Claim(s)]

[Claim 1] a medium [ semiconductor chips / one or more ] -- having -- among those -- being alike -- the negotiable securities characterized by being intermingled and having a thing with the function which sends out the recognition number contained in the semiconductor chip of this \*\*, and a thing without the function which sends out a recognition number by the electromagnetic wave

[Claim 2] a medium [ semiconductor chips / one or more ] -- having -- among those -- being alike -- the negotiable securities characterized by for area without a printing pattern to exist in the front face of the medium of this \*\* part in order to show that it is intermingled, have a thing with the function which sends out the recognition number contained in the semiconductor chip of this \*\*, and a thing without a function by the electromagnetic wave, and all or a part of semiconductor chip group of these these \*\* exists in the medium of this \*\*

[Claim 3] a medium [ semiconductor chips / one or more ] -- having -- among those -- being alike -- the negotiable securities which characterize by to be shown the positional information in which a semiconductor chip exists although it has the function which is intermingled, has a thing with the function which sends out the recognition number contained in the semiconductor chip of this \*\*, and a thing without a function by the electromagnetic wave, and sends out the recognition number of this \*\* in some media of this \*\* by scramble technology, such as encryption

[Claim 4] a medium [ semiconductor chips / one or more ] -- having -- among those -- being alike -- the negotiable securities which characterize by to be show the positional information do exist in some media of this \*\* by scramble technology , such as encryption , when a semiconductor chip do exist , although it have the function which intermingle , have a thing with the function which send out the recognition number contain in the semiconductor chip of this \*\*, and a thing without a function by the electromagnetic wave , and send out the recognition number of this \*\*

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## DETAILED DESCRIPTION

## [Detailed Description of the Invention]

[The technical field to which invention belongs] Especially this invention relates to performing forged prevention of negotiable securities effectively and economically about negotiable securities.

[Description of the Prior Art] The next invention is indicated by the publication-number No. 50672 [ eight to ] official report. About the security thread recognition equipment of various token device media, such as negotiable securities, this invention embeds metal patterns, such as a character, into various token device media, and tends to detect this pattern electrically by the existence of metal.

Forgery presupposes that it is difficult by putting a certain metal pattern only into the usual paper to the purpose which gives and forges advanced copy technology fundamentally.

[Problem(s) to be Solved by the Invention] If negotiable securities, such as a gift certificate and a stock certificate, are large sums, they are under the threat forged continuously a certain forge fire. as for these negotiable securities, various forged prevention technology is given -- by the method by the metal pattern of the conventional technology, it may be the material which comes to hand simply, and the arrangement to a medium may become clear, and the resistance over forgery may be weak Moreover, in the forged preventing method, the consideration which becomes enough may not be made to it being required to strengthen resistance gradually.

[Means for Solving the Problem] a medium [ semiconductor chip / of one or more / means / 1st / to solve the aforementioned technical problem ] ] -- having -- among those -- being alike -- it is considering as the negotiable securities characterized by being intermingled and having a thing with the function which sends out the recognition number contained in the semiconductor chip of this \*\*, and a thing without a function by the electromagnetic wave a medium [ semiconductor chip / of one or more / means / 2nd / to solve the aforementioned technical problem ] ] -- having -- among those -- being alike -- A thing with the function which sends out the recognition number contained in the semiconductor chip of this \*\* by the electromagnetic wave, It is considering as the negotiable securities characterized by area without the printing pattern which shows it being intermingled, having a thing without a function and all or some of semiconductor chip county of these these \*\* existing in the medium of this \*\* existing in the front face of the medium of this \*\* part. a medium [ semiconductor chip / of one or more / means / 3rd / to solve the aforementioned technical problem ] ] -- having -- among those -- being alike -- A thing with the function which sends out the recognition number contained in the semiconductor chip of this \*\* by the electromagnetic wave, Although it has the function which is intermingled, has a thing without a function and sends out the recognition number of this \*\*, it is considering as the negotiable securities characterized by showing the positional information in which a semiconductor chip's exists in some media of this \*\* by scramble technology, such as encryption. a medium [ semiconductor chip / of one or more / means / 4th / to solve the aforementioned technical problem ] ] -- having -- among those -- being alike -- Although it has the function which is intermingled, has a thing with the function which sends out the recognition number contained in the semiconductor chip of this \*\*, and a thing without a function by the electromagnetic wave, and sends out the recognition number of this \*\*, when a semiconductor chip does not exist, It is considering as the

negotiable securities characterized by showing the positional information not existing in some media of this \*\* by scramble technology, such as encryption.

[Embodiments of the Invention] (Example 1) Drawing 1 is the example of this invention. There is a portion 13 the area 12 which shows positional information is shown [ portion ] in the front face of negotiable securities 11, and a part of negotiable securities do not have [ portion ] a printing pattern, and a semiconductor chip 14 distributes and exists in the interior, front face, or rear face of negotiable securities. The peculiar recognition number is saved in memory, induction of the energy is carried out by the electromagnetic wave from the outside, voltage is applied to a predetermined circuit, further, with the clock generation vessel of the exterior or the interior, the status in a semiconductor chip changes and the semiconductor chip has the function which sends out serially the content of the memory (1 bit or two or more bits) inside a semiconductor. Even if the antenna received by the electromagnetic wave is in the upper surface of a semiconductor chip, an inferior surface of tongue, or the side and is larger than the size of a semiconductor chip, it may be small. With what is arranged beforehand in the position of a schedule, this semiconductor chip may always be distributed, and the position may be individually determined by each negotiable securities. As for a semiconductor chip, in any case, it may exist in the interior, front face, or one or more rear faces of negotiable securities. Moreover, no semiconductor chips need to send out the content of the above-mentioned memory, and some semiconductor chips may have that it is the same as that of the semiconductor chip to which only a dimension sends out the content of memory, without sending out the content of memory. Therefore, as long as the gestalt which distributed the semiconductor chip of negotiable securities is seen, it does not become settled uniquely in which place the semiconductor chip which the semiconductor chip which sends out the content of memory, and the semiconductor chip which is not the delivery about the content of memory are what rates, and sends out the content of memory exists. In the position to forge, this \*\*\*\* that a forged partner does not become settled uniquely, and reduces forged value. Next, about existence of a semiconductor chip, unless the existence of existence becomes clear immediately, it does not function effectively in that by which forged prevention is made. therefore, in order to show that the semiconductor chip is distributing, existence of the semiconductor chip which prepared one or more portions which do not have a printing pattern in a part of negotiable securities, and was distributed in area becomes clear effectively -- as -- comparatively -- a large area -- it is -- making -- a semiconductor chip -- effective -- \*\*\*\*\* rare \*\*\*\*\* -- the gestalt which shows things is proposed The existence of the existence of a semiconductor chip enables it to distinguish the size of a semiconductor chip clearly by viewing with 1 to about 0.1mm. Furthermore, it proposes that make size of this semiconductor chip into the same size, and a chip with the function which sends out the identification number in inner memory, and a chip without such a function are intermingled intentionally. It is because it is able to make it not to go into the range which forges the same thing very economically no matter what equipment [ currently possessed ] it may utilize, if it is because there is flexibility which distributes a \*\*-less a small number of minimum all shell and a maximum of 100,000 chips or more which send out such an identification number and is distribution of an effective chip of the highest level. It is the fundamental view of application of forged prevention technology for it not to be necessary to attain suddenly to such the advanced forged prevention level, and to improve resistance gradually actually. First, as an application level, the chip which functions regularly does not exist at all, but it proposes that the semiconductor chip not functioning is in a distributed \*\*\*\*\* rare \*\*\*\*\* state by remarkable negotiable securities. Since there is a portion which does not have the printing pattern which shows that the semiconductor chip is become empty and crowded in a part of negotiable securities become empty and crowded at this time, it is clear that they are the new forged prevention negotiable securities with which the semiconductor chip was become empty and crowded. Next, the semiconductor chip which sends out an identification number very partially is put into negotiable securities. It enciphers and the recognition number and \*\*\*\*\* position of this semiconductor chip are printed by a part of negotiable securities by laser or the ink jet. Even if this identification number does not exist, it enciphers as NULL and is indicated by negotiable securities. Therefore, in order to completely create the same thing, what is forged will need to carry out investigation analysis, and its time and effort will increase, and it will lose one economical merit [ one ].

That there is this need of investigating every sheet is the merit which adopts a semiconductor chip as forged prevention. since the measure method was conventionally taken in most important complexity, when forged technology was found, there was once a danger of being developed at a stretch For example, when an advanced color copy and an advanced printer spread, the technical problem reproduced simply occurred only with the conventional printing technology. If a semiconductor chip is used, it will be because it is [ that creation of the semiconductor chip itself is difficult, and ] very difficult for it to obtain the same number since a peculiar recognition number is indicated by each semiconductor chip and this number is uniquely managed in a database etc. For example, even if it is a 128-bit random number, in combination, it has the combination of 256 trillionx1 trillionx1 trillion, and by the number of the combination, it is based on the principle that the same number cannot be obtained even if it repeats a random number to ultra high-speed and generates in it per second. Next, when two or more things which made this number the same are created, simultaneous distribution of the same negotiable securities can think as a risk. Although it is both off-line discernment and online discernment at this time, the address of a number and a semiconductor chip is investigated at the time of off-line discernment. Since it rejects unless it is the same at all at this time, the creation technology of the same thing is because it balances economically. As long as a semiconductor chip is used, a cure is possible by improving forged resistance by advancing expansion to two or more chips gradually. Next, if it is online discernment, it will be that a career consists of Ming and the negotiable securities used at once cannot again be used. Therefore, if it is guaranteed at all that the identification number of a semiconductor chip is only best, online discernment becomes possible [ functioning effectively ].

(Example 2) Drawing 2 is another example of this invention. The semiconductor chip 22 which is not the delivery distributes the semiconductor chip 21 which sends out a recognition number, and a recognition number in the inside of negotiable securities 11, a front face, or a rear face, and it exists in it. A semiconductor chip can consider the gestalt in which the antenna is carried on chip below with the very small chip, for example, 1mm angle. By an internal inductance and an internal capacitor, this antenna forms a parallel or in-series resonance circuit, generates induced voltage by the microwave from the outside, and generates direct current voltage by the rectifier circuit in a semiconductor chip. A 128-bit read-only memory is in a semiconductor chip, and, as for the content of memory, a recognition number is minutely indicated by memory by electron ray direct writing on a wafer. Advanced cipher processing is made and this number cannot rewrite at least 1 bit of numbers freely. This recognition number can be read by the interrogator or the reader according to a predetermined protocol. Although the semiconductor chip which reads this recognition number justly is incorporable into or more one negotiable securities, it being intermingled with the semiconductor chip which does not put in a recognition number, and putting in into negotiable securities is performed at this time. thus, as the worst as having to investigate each chip, when forging, if it carries out -- the negotiable securities which have a peculiar number altogether must be forged -- moreover, forged volition will be reduced according to the time and effort which makes it look for negotiable securities with a small number of recognition number being required etc. Furthermore, if it says in the position of manufacturing negotiable securities, it will become possible to reduce a manufacturing cost and to heighten the forged prevention effect by restraining the manufacture number of the chip with which a recognition number is read, and freeing an arrangement position.

[Effect of the Invention] If negotiable securities, such as a gift certificate and a stock certificate, are large sums, they are under the threat forged continuously a certain forge fire. as for these negotiable securities, various forged prevention technology is given -- by the method by the metal pattern of the conventional technology, it is the material which comes to hand simply, and the arrangement to a medium becomes clear, and the resistance over forgery is weak Moreover, in the forged preventing method, it is not taken into consideration to it being required to strengthen resistance gradually. It compares, when not using the conventional semiconductor chip by applying a semiconductor chip according to this invention. Are that forgery presupposes that it is markedly difficult, in addition what does not function justly is included. Two or more semiconductor chips were distributed, and although functioned justly, the method of raising complexity gradually is proposed, such as enciphering a position

and recording on the surface of a medium, and a means to expand the difficulty which creates the same negotiable securities gradually and highly is offered. This method is effective also in aiming at forged prevention in economical efficiency.

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**TECHNICAL FIELD**

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[The technical field to which invention belongs] Especially this invention relates to performing forged prevention of negotiable securities effectively and economically about negotiable securities.

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PRIOR ART

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[Description of the Prior Art] The next invention is indicated by the publication-number No. 50672 [ eight to ] official report. About the security thread recognition equipment of various token device media, such as negotiable securities, this invention embeds metal patterns, such as a character, into various token device media, and tends to detect this pattern electrically by the existence of metal. Forgery presupposes that it is difficult by putting a certain metal pattern only into the usual paper to the purpose which gives and forges advanced copy technology fundamentally.

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EFFECT OF THE INVENTION

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[Effect of the Invention] If negotiable securities, such as a gift certificate and a stock certificate, are large sums, they are under the threat of being forged continuously by a certain forger. As for these negotiable securities, various forged prevention technologies are given -- by the method of the metal pattern of the conventional technology, it is the material which comes to hand simply, and the arrangement to a medium becomes clear, and the resistance to forgery is weak. Moreover, in the forged prevention method, it is not taken into consideration to it being required to strengthen resistance gradually. According to this invention, by applying a semiconductor chip, when not using the conventional semiconductor chip, it compares. Forgery presupposes that it is markedly difficult -- in addition, the method of raising complexity gradually is proposed, such as distributing two or more semiconductor chips, and enciphering a position and recording on the surface of a medium including what does not function justly, although it functioned justly, and a means to expand the difficulty which creates the same negotiable securities gradually and highly is offered. This method is effective also in aiming at forged prevention in economical efficiency.

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] If negotiable securities, such as a gift certificate and a stock certificate, are large sums, they are under the threat forged continuously a certain forge fire. as for these negotiable securities, various forged prevention technology is given -- by the method by the metal pattern of the conventional technology, it may be the material which comes to hand simply, and the arrangement to a medium may become clear, and the resistance over forgery may be weak Moreover, in the forged preventing method, the consideration which becomes enough may not be made to it being required to strengthen resistance gradually.

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MEANS

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[Means for Solving the Problem] a medium [ semiconductor chip / of one or more / means / 1st / to solve the aforementioned technical problem ] ] -- having -- among those -- being alike -- it is considering as the negotiable securities characterized by being intermingled and having a thing with the function which sends out the recognition number contained in the semiconductor chip of this \*\*, and a thing without a function by the electromagnetic wave a medium [ semiconductor chip / of one or more / means / 2nd / to solve the aforementioned technical problem ] ] -- having -- among those -- being alike -- A thing with the function which sends out the recognition number contained in the semiconductor chip of this \*\* by the electromagnetic wave, It is considering as the negotiable securities characterized by area without the printing pattern which shows it being intermingled, having a thing without a function and all or some of semiconductor chip county of these these \*\* existing in the medium of this \*\* existing in the front face of the medium of this \*\* part. a medium [ semiconductor chip / of one or more / means / 3rd / to solve the aforementioned technical problem ] ] -- having -- among those -- being alike -- A thing with the function which sends out the recognition number contained in the semiconductor chip of this \*\* by the electromagnetic wave, Although it has the function which is intermingled, has a thing without a function and sends out the recognition number of this \*\*, it is considering as the negotiable securities characterized by showing the positional information in which a semiconductor chip's exists in some media of this \*\* by scramble technology, such as encryption. a medium [ semiconductor chip / of one or more / means / 4th / to solve the aforementioned technical problem ] ] -- having -- among those -- being alike -- Although it has the function which is intermingled, has a thing with the function which sends out the recognition number contained in the semiconductor chip of this \*\*, and a thing without a function by the electromagnetic wave, and sends out the recognition number of this \*\*, when a semiconductor chip does not exist, It is considering as the negotiable securities characterized by showing the positional information not existing in some media of this \*\* by scramble technology, such as encryption.

[Embodiments of the Invention] (Example 1) Drawing 1 is the example of this invention. There is a portion 13 the area 12 which shows positional information is shown [ portion ] in the front face of negotiable securities 11, and a part of negotiable securities do not have [ portion ] a printing pattern, and a semiconductor chip 14 distributes and exists in the interior, front face, or rear face of negotiable securities. The peculiar recognition number is saved in memory, induction of the energy is carried out by the electromagnetic wave from the outside, voltage is applied to a predetermined circuit, further, with the clock generation vessel of the exterior or the interior, the status in a semiconductor chip changes and the semiconductor chip has the function which sends out serially the content of the memory (1 bit or two or more bits) inside a semiconductor. Even if the antenna received by the electromagnetic wave is in the upper surface of a semiconductor chip, an inferior surface of tongue, or the side and is larger than the size of a semiconductor chip, it may be small. With what is arranged beforehand in the position of a schedule, this semiconductor chip may always be distributed, and the position may be individually determined by each negotiable securities. As for a semiconductor chip, in any case, it may exist in the interior, front face, or one or more rear faces of negotiable securities. Moreover, no semiconductor chips

need to send out the content of the above-mentioned memory, and some semiconductor chips may have that it is the same as that of the semiconductor chip to which only a dimension sends out the content of memory, without sending out the content of memory. Therefore, as long as the gestalt which distributed the semiconductor chip of negotiable securities is seen, it does not become settled uniquely in which place the semiconductor chip which the semiconductor chip which sends out the content of memory, and the semiconductor chip which is not the delivery about the content of memory are what rates, and sends out the content of memory exists. In the position to forge, this \*\*\*\* that a forged partner does not become settled uniquely, and reduces forged value. Next, about existence of a semiconductor chip, unless the existence of existence becomes clear immediately, it does not function effectively in that by which forged prevention is made. therefore, in order to show that the semiconductor chip is distributing, existence of the semiconductor chip which prepared one or more portions which do not have a printing pattern in a part of negotiable securities, and was distributed in area becomes clear effectively -- as -- comparatively -- a large area -- it is -- making -- a semiconductor chip -- effective -- \*\*\*\*\* rare \*\*\*\*\* -- the gestalt which shows things is proposed The existence of the existence of a semiconductor chip enables it to distinguish the size of a semiconductor chip clearly by viewing with 1 to about 0.1mm. Furthermore, it proposes that make size of this semiconductor chip into the same size, and a chip with the function which sends out the identification number in inner memory, and a chip without such a function are intermingled intentionally. It is because it is able to make it not to go into the range which forges the same thing very economically no matter what equipment [ currently possessed ] it may utilize, if it is because there is flexibility which distributes a \*\*-less a small number of minimum all shell and a maximum of 100,000 chips or more which send out such an identification number and is distribution of an effective chip of the highest level. It is the fundamental view of application of forged prevention technology for it not to be necessary to attain suddenly to such the advanced forged prevention level, and to improve resistance gradually actually. First, as an application level, the chip which functions regularly does not exist at all, but it proposes that the semiconductor chip not functioning is in a distributed \*\*\*\*\* rare \*\*\*\*\* state by remarkable negotiable securities. Since there is a portion which does not have the printing pattern which shows that the semiconductor chip is become empty and crowded in a part of negotiable securities become empty and crowded at this time, it is clear that they are the new forged prevention negotiable securities with which the semiconductor chip was become empty and crowded. Next, the semiconductor chip which sends out an identification number very partially is put into negotiable securities. It enciphers and the recognition number and \*\*\*\*\* position of this semiconductor chip are printed by a part of negotiable securities by laser or the ink jet. Even if this identification number does not exist, it enciphers as NULL and is indicated by negotiable securities. Therefore, in order to completely create the same thing, what is forged will need to carry out investigation analysis, and its time and effort will increase, and it will lose one economical merit [ one ]. That there is this need of investigating every sheet is the merit which adopts a semiconductor chip as forged prevention. since the measure method was conventionally taken in most important complexity, when forged technology was found, there was once a danger of being developed at a stretch For example, when an advanced color copy and an advanced printer spread, the technical problem reproduced simply occurred only with the conventional printing technology. If a semiconductor chip is used, it will be because it is [ that creation of the semiconductor chip itself is difficult, and ] very difficult for it to obtain the same number since a peculiar recognition number is indicated by each semiconductor chip and this number is uniquely managed in a database etc. For example, even if it is a 128-bit random number, in combination, it has the combination of 256 trillionx1 trillionx1 trillion, and by the number of the combination, it is based on the principle that the same number cannot be obtained even if it repeats a random number to ultra high-speed and generates in it per second. Next, when two or more things which made this number the same are created, simultaneous distribution of the same negotiable securities can think as a risk. Although it is both off-line discernment and online discernment at this time, the address of a number and a semiconductor chip is investigated at the time of off-line discernment. Since it rejects unless it is the same at all at this time, the creation technology of the same thing is because it balances economically. As long as a semiconductor chip is used, a cure is possible by

improving forged resistance by advancing expansion to two or more chips gradually. Next, if it is online discernment, it will be that a career consists of Ming and the negotiable securities used at once cannot again be used. Therefore, if it is guaranteed at all that the identification number of a semiconductor chip is only best, online discernment becomes possible [ functioning effectively ].

(Example 2) Drawing 2 is another example of this invention. The semiconductor chip 22 which is not the delivery distributes the semiconductor chip 21 which sends out a recognition number, and a recognition number in the inside of negotiable securities 11, a front face, or a rear face, and it exists in it. A semiconductor chip can consider the gestalt in which the antenna is carried on chip below with the very small chip, for example, 1mm angle. By an internal inductance and an internal capacitor, this antenna forms a parallel or in-series resonance circuit, generates induced voltage by the microwave from the outside, and generates direct current voltage by the rectifier circuit in a semiconductor chip. A 128-bit read-only memory is in a semiconductor chip, and, as for the content of memory, a recognition number is minutely indicated by memory by electron ray direct writing on a wafer. Advanced cipher processing is made and this number cannot rewrite at least 1 bit of numbers freely. This recognition number can be read by the interrogator or the reader according to a predetermined protocol. Although the semiconductor chip which reads this recognition number justly is incorporable into or more one negotiable securities, it being intermingled with the semiconductor chip which does not put in a recognition number, and putting in into negotiable securities is performed at this time. thus, as the worst as having to investigate each chip, when forging, if it carries out -- the negotiable securities which have a peculiar number altogether must be forged -- moreover, forged volition will be reduced according to the time and effort which makes it look for negotiable securities with a small number of recognition number being required etc. Furthermore, if it says in the position of manufacturing negotiable securities, it will become possible to reduce a manufacturing cost and to heighten the forged prevention effect by restraining the manufacture number of the chip with which a recognition number is read, and freeing an arrangement position.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the drawing in which the 1st example of this invention is shown.

[Drawing 2] It is the drawing in which the 2nd example of this invention is shown.

[Description of Notations]

11 -- Negotiable securities

12 -- Area which shows positional information

13 -- Portion without a printing pattern

14 -- Semiconductor chip

21 -- Semiconductor chip which sends out a recognition number

22 -- Semiconductor chip which is not the delivery about a recognition number.

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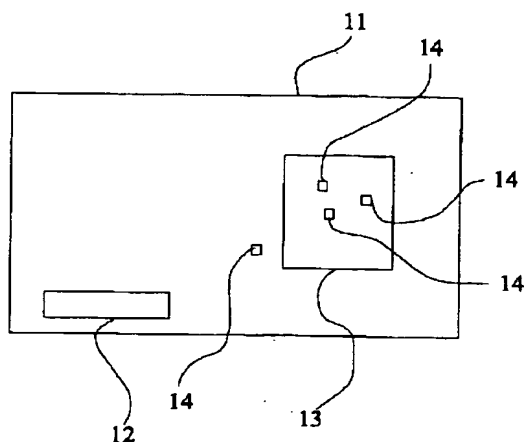
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DRAWINGS

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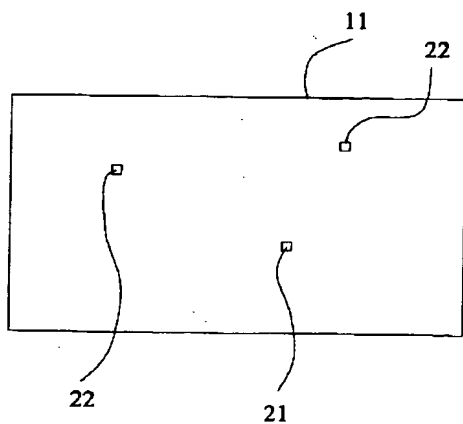
[Drawing 1]

図 1



[Drawing 2]

図 2



(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開2001-283011

(P2001-283011A)

(43) 公開日 平成13年10月12日 (2001. 10. 12)

(51) Int.Cl. <sup>7</sup>	識別記号	F I	テーマコード (参考)	
G 0 6 F 17/60	2 4 6	G 0 6 F 17/60	2 4 6	2 C 0 0 5
	2 1 4		2 1 4	3 E 0 4 1
	4 1 0		4 1 0 Z	5 B 0 3 5
B 4 2 D 15/10	5 0 1	B 4 2 D 15/10	5 0 1 P	5 B 0 5 5
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(21) 出願番号 特願2000-92951(P2000-92951)

(22) 出願日 平成12年3月28日 (2000. 3. 28)

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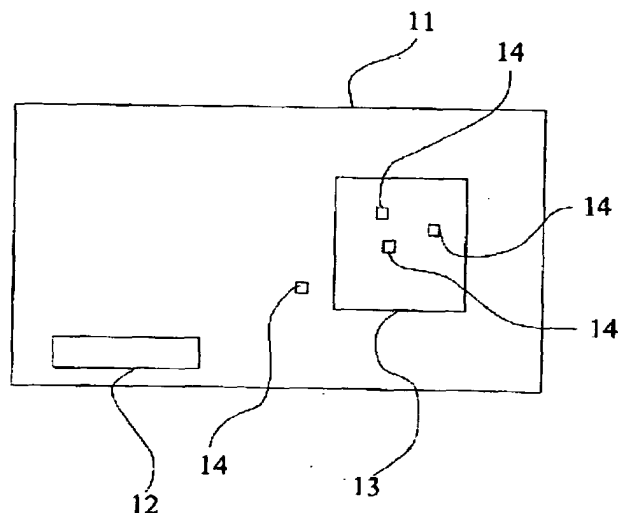
(54) 【発明の名称】 半導体チップを持つ有価証券

(57) 【要約】

【課題】 各種トークンデバイス媒体の中に文字などの金属パターンを埋め込んでおきこのパターンをメタルの有無で電気的に検出しようとするものである。基本的に通常の紙のみに高度のコピー技術をほどこして偽造する目的に対して何らかの金属パターンをいれることによって偽造が困難とするものである。

【解決手段】 一つまたは複数の半導体チップを媒体に有して、そのうちには、電磁波によって、当該の半導体チップ内に含まれる認識番号を送出する機能を持つものと、機能を持たないものを混在してもつことを特徴とする有価証券とすることである。

図 1



## 【特許請求の範囲】

【請求項1】一つまたは複数の半導体チップを媒体に有して、そのうちには、電磁波によって、当該の半導体チップ内に含まれる認識番号を送出する機能を持つものと、認識番号を送出する機能を持たないものを混在してもつことを特徴とする有価証券。

【請求項2】一つまたは複数の半導体チップを媒体に有して、そのうちには、電磁波によって、当該の半導体チップ内に含まれる認識番号を送出する機能を持つものと、機能を持たないものを混在してもち、これら当該の半導体チップ群のすべてまたは一部が当該の媒体に存在することをみせるために、印刷文様のないエリアが当該の媒体の表面一部に存在することを特徴とする有価証券。

【請求項3】一つまたは複数の半導体チップを媒体に有して、そのうちには、電磁波によって、当該の半導体チップ内に含まれる認識番号を送出する機能を持つものと、機能を持たないものを混在してもち、当該の認識番号を送出する機能を持つものの半導体チップの存在する位置情報が暗号化等のスクランブル技術によって当該の媒体の一部に示されることを特徴とする有価証券。

【請求項4】一つまたは複数の半導体チップを媒体に有して、そのうちには、電磁波によって、当該の半導体チップ内に含まれる認識番号を送出する機能を持つものと、機能を持たないものを混在してもち、当該の認識番号を送出する機能を持つものの半導体チップが存在しないとき、存在しない位置情報が暗号化等のスクランブル技術によって当該の媒体の一部に示されることを特徴とする有価証券。

## 【発明の詳細な説明】

【発明の属する技術分野】本発明は、有価証券に関し、特に有価証券の偽造防止を有効的にかつ経済的に行うことに関する。

【従来の技術】特開平8-50672号公報には次の発明が開示されている。この発明は有価証券などの各種トークンデバイス媒体のセキュリティスレッド認識装置に関するものであって、各種トークンデバイス媒体の中に文字などの金属パターンを埋め込んでおきこのパターンを金属の有無で電氣的に検出しようとするものである。基本的に通常の紙のみに高度のコピー技術をほどこして偽造する目的に対して何らかの金属パターンをいれることによって偽造が困難とするものである。

【発明が解決しようとする課題】商品券や株券などの有価証券は高額であればあるほど、たえず、偽造される脅威下にある。これらの有価証券は各種偽造防止技術が施されるが、従来技術の金属パターンによる方法では、簡単に入手される材料であり、また媒体への配置が明確となり、偽造に対する耐性が弱い可能性がある。また、偽造防止法において、段階的に耐性を強くすることが必要であることに對して、十分なる考慮がなされていない可

能性がある。

【課題を解決するための手段】前記の課題を解決する第1の手段は、一つまたは複数の半導体チップを媒体に有して、そのうちには、電磁波によって、当該の半導体チップ内に含まれる認識番号を送出する機能を持つものと、機能を持たないものを混在してもつことを特徴とする有価証券とすることである。前記の課題を解決する第2の手段は、一つまたは複数の半導体チップを媒体に有して、そのうちには、電磁波によって、当該の半導体チップ内に含まれる認識番号を送出する機能を持つものと、機能を持たないものを混在してもち、これら当該の半導体チップ群のすべてまたは一部が当該の媒体に存在することをみせる印刷文様のないエリアが当該の媒体の表面一部に存在することを特徴とする有価証券とすることである。前記の課題を解決する第3の手段は、一つまたは複数の半導体チップを媒体に有して、そのうちには、電磁波によって、当該の半導体チップ内に含まれる認識番号を送出する機能を持つものと、機能を持たないものを混在してもち、当該の認識番号を送出する機能を持つものの半導体チップの存在する位置情報が暗号化等のスクランブル技術によって当該の媒体の一部に示されることを特徴とする有価証券とすることである。前記の課題を解決する第4の手段は、一つまたは複数の半導体チップを媒体に有して、そのうちには、電磁波によって、当該の半導体チップ内に含まれる認識番号を送出する機能を持つものと、機能を持たないものを混在してもち、当該の認識番号を送出する機能を持つものの半導体チップが存在しないとき、存在しない位置情報が暗号化等のスクランブル技術によって当該の媒体の一部に示されることを特徴とする有価証券とすることである。

【発明の実施の形態】（実施例1）図1は、本発明の実施例である。有価証券11の表面には位置情報を示すエリア12があつて、また、有価証券の一部には印刷文様のない部分13があつて、また、有価証券の内部または表面または裏面には、半導体チップ14が分散して存在する。半導体チップは固有の認識番号がメモリに保存されていて、外部からの電磁波によって、エネルギーが誘起されて、所定の回路に電圧が加えられて、さらに外部または内部のクロック発生器によって、半導体チップ内のステータスが変化して、半導体内部の1ビットまたは複数ビットのメモリの内容を逐次送出する機能をもっている。電磁波によって受信するアンテナは半導体チップの上面または、下面、または側面にあつて、半導体チップのサイズより大きくても、小さくてもよい。この半導体チップは予め予定の位置に配置されるものと、常に分散されて、位置が各有価証券で個別に決定されていることがある。いずれの場合も、半導体チップは有価証券の内部または、表面または裏面に一つ以上存在することがありうる。また、すべての半導体チップが上記のメモリの内容を送出する必要はなくて、一部の半導体チップはメ

メモリ内容を送出することなく、外形寸法のみが、メモリ内容を送出する半導体チップと同一であることがありうる。従って、有価証券の半導体チップを分散した、形態をみるかぎり、メモリ内容を送出する半導体チップとメモリ内容を送出しない半導体チップがどの程度の割合で、またメモリ内容を送出する半導体チップがどの場所に存在するかは一義的に定まらない。このことは、偽造する立場では、偽造相手が一義的に定まらないことをいみして、偽造価値を低減させる。次に、半導体チップの存在に関して、存在の有無が即座に判明しないと偽造防止がなされているものか有効に機能しない。そのため、半導体チップが分散していることをしめすために、有価証券の一部に印刷文様のない部分を一つまたは複数用意し、また面積的には分散した半導体チップの存在が有効的に判明するように、比較的大面積であるようにして、半導体チップが有効的に渡り込まれていることを示す形態を提案する。半導体チップのサイズは1mmから、0.1mm程度と目視することによって、半導体チップの存在の有無が歴然と判別できるようにする。さらに、この半導体チップのサイズを同サイズにして、中のメモリにある識別番号を送出する機能をもつチップとそのような機能をもたないチップを意識的に混在することを提案する。なぜなら、このような識別番号を送出するチップを少数最低全くなしから、最高10万個以上まで、分散する自由度があるからで、最高水準の有効チップの分散であれば、いかなる現有装置を活用してもとても経済的に同一のものを偽造する範囲に入らないようにすることが可能であるからである。現実的には、そのような、高度の偽造防止水準にいきなり達成する必要はなくて、段階的に耐性を向上することが、偽造防止技術の適用の基本的考え方である。まず、適用水準として、正規に機能するチップが全く存在せず、かなりの有価証券では機能しない半導体チップが分散渡り込まれている状態であることを提案する。このとき、すきこまれた有価証券の一部には、半導体チップがすきこまれていることを示す印刷文様がない部分があるので、半導体チップがすきこまれた、新しい偽造防止有価証券であることは明白である。次に極めて部分的に識別番号を送出する半導体チップを有価証券にいれる。この半導体チップの認識番号と、渡り込み位置は暗号化したりして、有価証券の一部にレーザやインクジェットによって印刷される。この識別番号が全くなくても、NULLとして暗号化し、有価証券に記載される。従って、偽造するものは、全く同一のものを作成するために一枚一枚、調査分析する必要があり、手間がふえ、経済的メリットを失ってしまう。この一枚一枚調査する必要性があることが、半導体チップを偽造防止に採用するメリットである。従来は、一義的複雑性をまず方法がとられるので、一旦、偽造技術が拾得されると一気に展開されてしまう危険性があった。たとえば、高度のカラーコピーやプリンタが普及する

と、従来の印刷技術のみでは、簡単に複製されてしまう課題があった。半導体チップを用いると、半導体チップ自体の作成が困難であることと、各半導体チップには、固有の認識番号が記載され、この番号はデータベースなどで一義的に管理されるので、同一の番号を得ることがきわめて困難であることによる。たとえば、128ビットの乱数であっても、組み合わせでは256兆x1兆x1兆の組み合わせをもち、その組み合わせの数では、毎秒超高速に乱数を繰り返し発生しても同じ番号を得ることができないという原理による。次に、この番号を同一にしたものを複数作成したとき、リスクとして同一有価証券の同時配布が考えることができる。このとき、オフライン識別と、オンライン識別の両者であるが、オフライン識別のときは番号と半導体チップのアドレスが調べられる。このとき、全く同一のものでないかぎり、リジェクトされるので、同一のものの作成技術が経済的に見合うかどうかによる。半導体チップを使う限り、複数チップへの展開を段階的に進めることにより、偽造耐性を向上していくことにより、対策が可能である。次にオンライン識別であれば、一度使用された有価証券は来歴が明からになって、二度と使用することは不可能となる。従って、半導体チップの識別番号が唯一無二であることが保証されている以上、オンライン識別は有効に機能することが可能となる。

(実施例2) 図2は、本発明の別の実施例である。有価証券11の中、または表面、または裏面には、認識番号を送出する半導体チップ21と認識番号を送出しない半導体チップ22が分散して存在する。半導体チップは極めて小さなチップたとえば1mm角以下でオンチップにアンテナが搭載されている形態が考えられる。このアンテナは内部のインダクタンスとコンデンサによって、並列または直列の共振回路を形成して、外部からのたとえばマイクロ波によって、誘導電圧を発生させて、半導体チップ内の整流回路によって、直流電圧を発生させる。半導体チップのなかにはたとえば128ビットのリードオンリメモリがあつて、メモリ内容はウエハ上で電子線直接描画によって、微細にメモリに認識番号が記載される。この番号は高度の暗号処理がなされており、勝手に番号を1ビットでも書き換えることは出来ない。この認識番号は、所定のプロトコルに従って、質問機またはリーダーによって読み出しが可能である。この認識番号を正當に読み出す半導体チップは一つ以上有価証券に組込を行うことができるが、このとき、認識番号を入れない半導体チップと混在して、有価証券の中にいれることが行われる。このようにすると、偽造するとき、一つ一つのチップを調査しなければならないことと、最悪すべて固有の番号を持つ有価証券を偽造しなければならないことと、また少数の認識番号を持つ有価証券を探さす手間が必要であることなどにより、偽造意欲を低減させてしまう。さらに、有価証券を製造する立場でいえば、認識番

号が読み出されるチップの製造個数を制約し、かつ配置位置を自由にすることによって、製造コストを低減し、かつ偽造防止効果を高めることが可能となる。

【発明の効果】商品券や株券などの有価証券は高額であればあるほど、たえず、偽造される脅威下にある。これらの有価証券は各種偽造防止技術が施されるが、従来技術の金属パターンによる方法では、簡単に入手される材料であり、また媒体への配置が明確となり、偽造に対する耐性が弱い。また、偽造防止法において、段階的に耐性を強くすることが必要であることに対して、考慮されていない。本発明によれば、半導体チップを適用することによって、従来の半導体チップを使用しない場合に比較して、偽造が格段と困難とすることの加えて、正当に機能しないものを含めて、複数の半導体チップを分散配置し、かつ正当に機能するものの位置を暗号化して媒体

の表面に記録するなど、複雑性を段階的に高める方法を提案しており、同一の有価証券を作成する困難性を段階的かつ高度に拡大する手段を提供している。この方法は経済的に偽造防止を図ることにおいても有効である。

【図面の簡単な説明】

【図1】本発明の第1の実施例を示す図面である。

【図2】本発明の第2の実施例を示す図面である。

【符号の説明】

11…有価証券

12…位置情報を示すエリア

13…印刷文様のない部分

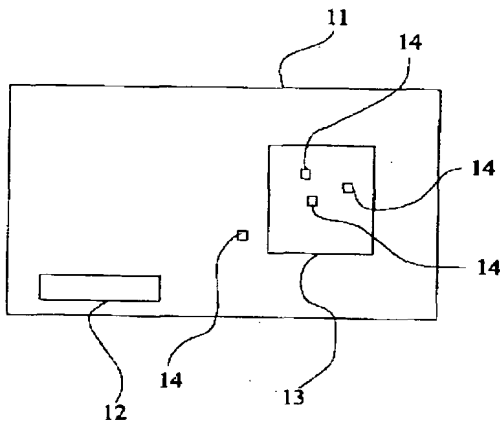
14…半導体チップ

21…認識番号を送出する半導体チップ

22…認識番号を送出しない半導体チップ。

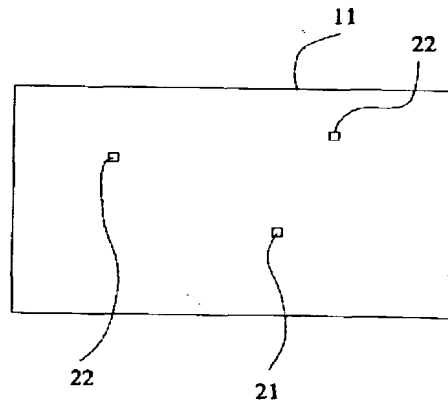
【図1】

図 1



【図2】

図 2



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(51) Int. Cl. <sup>7</sup>

G 0 6 K 19/077

19/10

G 0 7 D 7/10

H 0 4 L 9/32

識別記号

F I

G 0 7 D 7/10

G 0 6 K 19/00

H 0 4 L 9/00

テーマコード(参考)

K

R

6 7 3 E

F ターム(参考) 2C005 HA02 HB10 JA26 MB10 NA09  
SA02 SA06 SA12 TA22  
3E041 AA01 BB07 DB01  
5B035 AA13 BA03 BB09 CA01 CA11  
5B055 CA00 CB00 CC13  
5J104 AA07 KA15 NA05 NA35 NA36  
NA38 PA12